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VACAVILLE, CALIFORNIA

VACA VALLEY RADIO CLUB

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May 2010

President's Message

Hi All. We will be having a special guest at this month's meeting.

Art Mayoff, AB6HB, will be joining us and giving a talk on the subject of radio as it was addressed as a new technology in the December 1925 edition of Popular Science.

Saturday, April 17th, myself, Marcus (KI6WDX), Glen (W6JLX) and Chris(KD7TQO) provided radio support to the March of Dimes walk at Pena Adobe Park. Everything went off without a hitch and a good time was had by all.

Hope to see you at the next meeting on the 12th of May.

73,

Scott KI6YYZ

ART MAYOFF IS COMING TO TOWN

Art Mayoff, AB6HB from the Benicia ARC has created a PowerPoint presentation based on a first person article appearing in the December 1925 issue of Popular Science Magazine. The PowerPoint is written as if the author in 1925 was personally delivering it. This is one of those presentations that can be as short as 15 minutes or as long as 45, depending on audience interaction and comments. It might even make all the old guys "warm and fuzzy."

Join us for this interesting trip in the **Way-Back Machine** about the challenges of this *new technology* they call *Radio*.

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April Meeting Minutes

The meeting was called to order at 7:00pm local time by club president Scott Joseph KI6YYZ.

The financial report was presented and approved by the board with no changes. The March club meeting minutes were presented and approved with no changes by the board.

Old Business—Sign ups for the annual March of Dimes event took place. Discussion about the event cleared up all concerns.

New Business—None.

The raffle was won by Marcus KI6YDX, first timer too.

It was brought up that in May we need to formalize our Field Day logistics since that will be the last formal meeting that will take place prior to the event. June is a pizza party meeting.

On A Mission!

Our trusty publisher Bob K6HEW was unavailable to publish this newsletter this month. Bob in on a Red Cross mission in Mississippi with a return date that is yet to be determined.

Apologies to those of you that don't get this newsletter until the day of the meeting.

The newsletter was mailed Sunday night with a Monday postmark.

For future reference a list will be created with current email addresses with the idea of keeping you up to date over the summer should something interesting be happening. We don't normally publish in July and August.

Around the Shack

By Jerry Olive, KD6WKY

This is the time of year we see some rugged individuals put together their one man band DXpeditions to comfortable places usually near water or wilderness. I've worked two stations like this in the past month.

Kaz Oya, ZL7JP of New Zealand decided to go over to Chatham Island and work for a few days as ZL7J. All by himself running 5Ø watts and a vertical antenna he had huge pile ups.

As summer gets closer more stations will start showing up in the Northern Territory of Canada with those long summer nights.

In mid-April there was a DXpedition to the Kurdistan region of Northern Iraq using the call sign YI9PSE. Google the call sign to see their very cool website. I was lucky to work this station on Sunday afternoon on 2Øm SSB using every bit of power I could squeeze out of my AL-811 amp. I only had a short window of opportunity since their signal was barely heard on the West Coast. I could hear their CW signals but not good enough to try and work them, the SSB was a bit stronger.

The following weekend I bumped into Paul Ewing N6PSE who was on the DXpedition the prior weekend in Iraq. I was at the International DX Convention in Visalia where he was a speaker. As it turned out the CW station didn't have the best antenna situation so their signal was weaker than the side band signal.

Although their group was active on all bands I know of no one that worked them here on any other band than 2Ø meters phone or CW.

I'll be putting together an antenna party this month to have enough people here to adjust my little beam antenna. The antenna needs a little tuning on 2Ø meters to bring down the SWR in the CW part of the band. It also needs to be re-oriented on north so the rotor and antenna are in sync. I have not brought that antenna down in about two years, so a little TLC is a good idea about now. More later on the antenna party.

VACA VALLEY RADIO CLUB—2010 ELECTED OFFICERS

President: Scott Joseph, KI6YYZ
Vice President: Kim Ware, KI6JNX
Secretary: Jerry Olive, KD6WKY
Treasurer: Bob Hewitt, K6HEW

BOARD OF DIRECTORS

Director: Mike Vieira, W6MAV
Director: Chris Jones, KD7TQO
Director: Antonio Del Rio, N6ZGB
Director: Glen Mitchell W6JLX

APPOINTED POSITIONS

Net Control Chairperson: Kim Ware, KI6JNX
Activities Chairperson: Board of Directors
Newsletter Editor: Jerry Olive, KD6WKY
Newsletter Publisher & Distributor: Bob Hewitt, K6HEW

FCC Proposes Additions, Changes to Amateur 5 MHz Allocation

Acting on a 2006 *Petition for Rulemaking* filed by the ARRL, the FCC has issued a *Notice of Proposed Rule Making* (*NPRM*), ET Docket No 10-98 to modify the rules that govern amateurs' secondary use of five channels in the 5 MHz frequency range known as 60 meters. The proposed changes would substitute a new channel for one that is seldom available because of occupancy by the fixed service, which is primary in this range. Also proposed is an increase in power from 50 to 100 W effective radiated power (ERP) and the addition of CW, PSK31 and PACTOR-III modes with provisions to ensure that such operations would be compatible with the primary service. The proposed changes can be found beginning on page 8 of the *NPRM*. "The ARRL is pleased that the Commission has opened this proceeding to increase the usefulness of the limited 5 MHz Amateur Service allocation," said ARRL Chief Executive Officer David Sumner, K1ZZ. "We are gratified that the Commission and the NTIA agree that the responsible manner in which amateurs have been using the five USB channels warrants some expansion of privileges so that the Amateur Service can be even better prepared for service to the public."

The Last Tech-Plus License to Expire in June

In February 1991, the FCC dropped the 5 WPM Morse code requirement for new Technician licensees, and in 1994, it created a new class of Amateur Radio license: the Technician-Plus, also called Tech-Plus. This new license differed from the Technician license in that Tech-Plus licensees had passed the code test and had more operating privileges on HF. Patricia Phillips, N3IGI, of Pittsburgh, Pennsylvania, received her Technician licensee on June 12, 1990. On March 21, 2000, she upgraded her license to Tech-Plus, and, at the same time, renewed her license, now set to expire June 12, 2010. This makes Phillips the last Tech-Plus in the FCC database. If she renews her Amateur Radio license, she will be a Technician.

In 2000, the FCC restructured the license classes, and where there were six classes -- Novice, Technician, Tech-Plus, General, Advanced and Amateur Extra -- only the Technician, General and Amateur Extra survived. Novice and Advanced class licenses could still be renewed and modified, but Tech-Plus licensees would be classified as Technicians upon renewal, but still retain their code credit and HF operating privileges.

According to the FCC's Bill Cross, W3TN, the Tech-Plus licenses came about when those who had earned their Technician licenses when the Morse code requirement was still in effect wanted a way to distinguish themselves from the new Techni-

Technician licensees (who did not have a Morse code requirement). In 1994 -- and effective December 20, 1994 -- the FCC issued and *Order* called *Amendment to Amateur Service Rules to Change Procedures for Filing an Amateur Service License Application and to Make Other Procedural Changes* that instituted the Tech-Plus license class: "*Technician Plus* means that a Technician class licensee has also passed a telegraphy examination. We believe that showing this information in our licensee data base and license document as a separate class rather than continue to treat it as a category of the Technician class is consistent with current licensing procedures."

What is Spread Spectrum?

A spread spectrum system is one in which the transmitted signal is spread over a wide frequency band, much wider, in fact, than the minimum bandwidth required to transmit the information being sent (ref. 1). Spread spectrum communications cannot be said to be an efficient means of utilizing bandwidth. However, it does come into its own when combined with existing systems occupying the frequency. The spread spectrum signal being "spread" over a large bandwidth can coexist with narrowband signals only adding a slight increase in the noise floor that the narrowband receivers see.

Why Spread Spectrum?

To answer the question "why should I use spread spectrum" could easily degenerate into a simple listing of advantages and disadvantages. However, spread spectrum has many different unique properties that cannot be found in any other modulation technique. As radio amateurs, we should exploit these properties and search for useful applications. Think of spread spectrum as another useful tool in our repertoire of modulation methods toolbox. For completeness, I will list some advantages and disadvantages that you will see for typical spread spectrum systems. Bare in mind that these come about because of the nature of spread spectrum, not because they are direct attributes.

Advantages: - Resists intentional and non-intentional interference - Has the ability to eliminate or alleviate the effect of multipath interference - Can share the same frequency band (overlay) with other users - Privacy due to the pseudo random code sequence (code division multiplexing)

Disadvantages: - Bandwidth inefficient - Implementation is somewhat more complex.

Other Properties

There are several unique properties that arise as a result of the pseudo random code sequence and the wide signal bandwidth that results from spreading. Two of these are selective addressing and code division multiplexing. By assigning a given code to a single receiver or a group of receivers, they may be addressed individually or by group away from other receivers assigned a different code. Codes can also be chosen to minimize interference between groups of receivers by choosing ones that have low cross correlation properties. In this manner more than one signal can be transmitted at the same time on the same frequency. Selective addressing and Code Division Multiple Access (CDMA) are implemented via these codings. A second set of properties is low probability of intercept (LPI) and anti-jamming. When the intelligence of the signal is spread out over several megahertz of spectrum, the resulting power spectrum is also spread out. This results in the transmitted power spread out over a wide frequency bandwidth and makes detection in the normal sense (without the code), very difficult. Though LPI is not a typical application for radio amateurs, it would best to rename this property as "reduction of interference." Thus spread spectrum can survive in an adverse environment and coexists with other services in the band. The anti-jamming property results from the wide bandwidth used to transmit the signal. Recall Shannon's Information-rate theorem

$C = W \log (1 + S/N)$
C = capacity in bits per second
W = bandwidth S = signal power N = noise power

where the capacity of a channel is proportional to its bandwidth and the signal-to-noise ratio on the channel. By expanding the bandwidth to several megahertz and even several hundred megahertz, there is more than enough bandwidth to carry the required data rate and have even more to spare to counter the effects of noise. This anti jamming quality is usually expressed as "processing gain."

So for the radio amateur, the properties of code division multiplexing, coexistence in an adverse environment, and processing gain, are all excellent reasons to experiment with and find useful applications for spread spectrum in the amateur radio service. Coupled with these reasons, amateurs can also enjoy increased data rates in digital data (packet radio) that cannot be done with conventional amateur or commercial radios due to physical (i.e. bandpass filters) and rules restrictions. For example, narrowband systems in the 70 cm band are limited to a maximum data rate of 56 kbps and a bandwidth of 100 kHz,

THE VVRC WELCOMES YOU

The Repeater is Published by the Vaca Valley Radio Club, PO Box 143, Elmira, CA 95625-0143, An ARRL Affiliated Club. Founded 1987, Chartered 1988 General Meetings: 2nd Wednesday of each month at 7:30 PM 420 Vine Street Fire Station.

Wheelchair accessible

Visit the Repeater online courtesy of Bob K6HEW at:
http://www.jcis.net/~hewbob/vvrc/index.htm

Club repeater in Vacaville:W6VVR 145.470 MHz(-) pl 127.3
The W6VVR net call is Tuesday evenings at 7pm on the club repeater. All are invited to participate in this weekly meeting on the air. 73!

Additional local repeaters
WV6F 224.200(-) WV6F 440.025(+) PL 127.3
W6OMF Repeater 224.540 MHz, PL 118.8 Hz

there are no such restrictions in the 33 cm band and up.

Perhaps one of the most important reasons to use spread spectrum is its ability discriminate against multipath interference. A RAKE receiver implementation for direct sequence allows individual signal paths to be separately detected and the coherently combined with other paths. This not only tends to prevent fading but also provides a path diversity effect resulting in very rugged links in terrestrial mobile communications (ref. 2).

Building Blocks

Spread spectrum signals are demodulated in two steps: 1) the spectrum spreading (direct sequence, frequency hopping) modulation is removed, and 2) the signal is demodulated. The process of despreading a signal is called correlation. The spread spectrum signal is despread when the proper synchronization of the spreading code between the transmitter and receiver is achieved. Synchronization is the most difficult aspect of the receiver. More time, research, effort, and money has gone into the development and improving of synchronization techniques than in any other area of spread spectrum. The problem of synchronization is further broken down into two parts: initial acquisition and tracking.

There are several methods to solve the synchronization problem. Many of these methods require a great deal of discrete components to implement. But perhaps the biggest breakthrough has been from Digital Signal Processing (DSP) and Application Specific Integrated Circuits (ASIC). DSP has provided high speed mathematical functions that can slice up in many small parts and analyze the spread spectrum signal to synchronize and decorrelate it. ASIC chips drive down the cost by using VLSI technology and creating generic building blocks that can be used in any type of application the designer wishes. With the fast growing Part 15 and Personal Communications System (PCS) spread spectrum market, many ASIC manufactures have been designing and selling ASIC chips that take care of the most difficult problem in spread spectrum -- despreading and synchronization. With a few extra components, the amateur can have a fully functioning spread spectrum receiver.

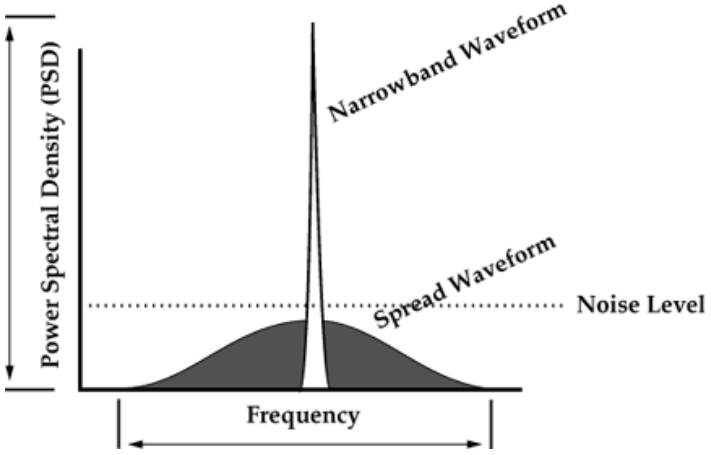
One manufacture of a spread spectrum demodulator ASIC is Loral Communications Systems (recently Unisys Communications Systems Division) DSP Components, Dept. 9065, M/S F1F12, 640 North 2200 West, Salt Lake City, Utah 84116-2988; Phone: (801) 594-2440. Their PA-100 performs the functions of despreading and demodulation, carrier recovery loop (frequency or phase), Pseudo Noise (PN) code detection, PN code tracking loop, data synchronization, and automatic gain control. It is programmable and offers a wide range of choices in data rates, modulation types, processing gains, PN codes, loop bandwidths, and tracking and acquisition procedures. It is capable of chipping rates up to 32 Mcps and data rates up to 64 Mbps. The PA-100 is controlled via a simple 8-bit interface. The chip is a 208-pin plastic Metrix Quad Flat Package (MQFP). The cost of the chip is $167.00 in single qty and $67.00 in lots of 1000.

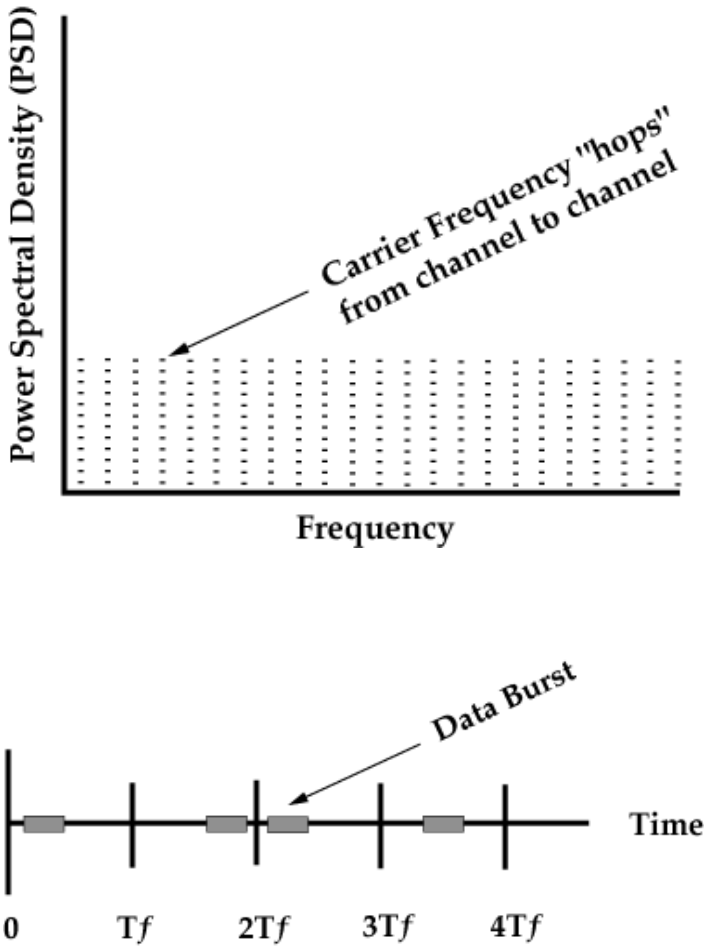
Where does Part 15 fit into all this?

Many of the spread spectrum devices on the market today are listed as Part 15 devices. This refers to the device operating under the provisions of Title 47 Section 15.247 of the Code of Federal Regulations (CFR). There are three frequency bands allocated to this service:
902 - 928 MHz (26 MHz bandwidth) 2400 - 2483.5 MHz (83.5 MHz bandwidth) 5725 - 5850 MHz (125 MHz bandwidth)

Operation under this provision of this section is limited to frequency hopping and direct sequence spread spectrum. No other spreading techniques are permitted. Section 15.247 defines the technical standards that these systems must operate under. For example, the maximum peak output power of the transmitter shall not exceed 1 watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. This equates to a maximum transmitter EIRP of +6dBW (1 watt into a 6 dBi gain antenna) Part 15 equipment operates on a secondary basis. Users must accept interference from other transmitters operating in the same band and may not cause interference to the primary users in the band. Primary users are government systems such as airborne radiolocation systems that emit a high EIRP; and Industrial, Scientific, and Medical (ISM) users. Thus the Part 15 device manufacturer must design a system that will not cause interference with and be able to tolerate the noisy primary users of the band. And this is where spread spectrum systems excel because of their low noise transmissions and ability to operate in an adverse environment.

Amateurs should realize that under the present Part 97 rules and regulations governing amateur spread spectrum today, taking a Part 15 spread spectrum device and adding an amplifier to it would break the rules. Even though it would be transmitting within the amateur spectrum, it more than likely would not be using one of the specified spreading codes assigned to amateur operation (refer to Sec. 97.311 Section (d) - SS emission types). However, this should not deter the radio amateur from using Part 15 devices in their experimentation or use in the amateur service. The device should be monitored to ensure that it remains under the Part 15 regulations and as such, no Part 97 regulations apply. Amateur traffic can flow though Part 15 devices, and they do not require a callsign since they do not require a license. However, the radio amateur should realize that when the traffic enters the amateur bands, for example,





PLEASE RENEW YOUR MEMBERSHIP

VACA VALLEY RADIO CLUB, INC.

MEMBERSHIP APPLICATION / RENEWAL FORM

Please Print & Fill in Completely — Dues are delinquent January 1st

Name: _____ Call Sign_____
Street: _____
City: _____Zip: _____
Phone: (_____) _____-_____OK to Publish ?(_____)
License Class: _____ ARRL Member ?(_____)
E-Mail Address_____

FAMILY Member (Spouse or Children)

Name: _____ Call Sign_____
License Class: _____ARRL Member ?(_____)
Name: _____ Call Sign_____
License Class: _____ARRL Member ?(_____)
Name: _____ Call Sign_____
License Class: _____ARRL Member ?(_____)

MEMBER Dues --------- $20.00 _____
Each Family Member -- $ 2.00 _____
Student ---------- $ 5.00 _____
Repeater/Autopatch donation --- _____
Call/Name badge -------- $10.00 _____

Optional ARRL membership
ARRL dues ---------- $37.00 _____
ARRL dues (Senior) ---- $34.00 _____
Senior is 65 yr or older with one time proof on age.

Total---------- _____
Paid by CASH: ____ Check #_____

Mail to : Vaca Valley Radio Club, PO Box 143, Elmira, CA 95625-0143